

## R E M A R K S

Reconsideration of the present application, as amended, is respectfully requested.

The September 12, 2002 Office Action and the Examiner's comments have been carefully considered. In response, the specification is amended, claims are added, and remarks are set forth below in a sincere effort to place the present application in form for allowance. The amendments are supported by the application as originally filed. Therefore, no new matter is added.

### Specification

The specification is amended to place the specification in better form. No new matter is added.

### Claim Amendments

Claims 11-18 are added to the present application. Claims 11-18 correspond to claims 1 and 4-10, respectively. Claim 11 differs from claim 1 in that "intercepting means" has been replaced by --intercepting element-- to provide a different scope of protection for the invention. Claims 12-18 differ from claims 4-10 in that claims 12-18 are dependent on claim 11 instead of claim 1.

It is respectfully believed that no additional fees are due for the presentation of claims 11-18. If any additional fees are due, please charge our Deposit Account No. 06-1378 for such sum.

### Prior Art Rejections

In the Office Action, claims 1 and 4 are rejected under 35 USC 102(e) as being anticipated by USP 5,910,962 (Pan et al). Claims 5-10 are rejected under 35 USC 103 as being unpatentable over Pan et al.

According to the present claimed invention as defined by claim 1, the external cavity laser includes a FBG (Fiber Bragg Grating) section (20) provided on an optical path between a laser light emitting device (10) and a first connector (30), and intercepting means (27) provided on the optical path between the FBG section and the first connector (30). This arrangement prevents light which is provided by the laser light emitting device from being returned from the connector through the FBG section toward the external cavity formed between a reflection surface of the laser light emitting device and the FBG section, thereby reducing the relative intensity of noise (RIN).

It is respectfully submitted that claim 1 is patentable over Pan et al. for reasons, *inter alia*, set forth below.

Applicants respectfully state that the Examiner's contention in the Office Action that WDM coupler 38 shown in Fig. 3B of Pan corresponds to a connector of the present claimed invention is incorrect since the term "coupler" indicates a device which is quite different from that indicated by the term "connector" in the field to which the present invention pertains.

For example, the following definitions are found in "FIBER OPTICS STANDARD DICTIONARY."

**fiber optic connector**-A device that simply and easily permits coupling, decoupling, and recoupling of optical signals or power from each optical fiber in a cable to corresponding fibers in another cable.

**fiber optic coupler**-A device that transfers optical signals from one propagation medium to another, usually without using a fiber optic splice or connector.

Pan et al (USP 5,910,962; USP 5,892,781) merely relate to a fiber laser that is entirely different from the external cavity laser recited in claim 1.

In the external cavity laser of the present invention, a cavity is formed between a reflective surface of a semiconductor laser (LD) and an FBG disposed outside the semiconductor laser, as apparent from claim 1 wherein "a cavity that is formed between the laser light emitting device and the grating, and that resonates the light between the reflective surface of the laser light emitting device and the grating, thereby oscillating a laser beam having a given oscillation wavelength."

In contrast, in the fiber laser disclosed in Pan '962 and Pan '781, a semiconductor laser is merely used for excitation, and a laser cavity is formed by reflection between two gratings both of which are disposed outside the semiconductor laser, as clearly stated at col. 2, lines 32-33 of Pan '962 patent. In other words, a reflective surface of the semiconductor laser does not serve as a reflective surface of a "laser cavity including a grating" as recited in claim 1.

More specifically, lasers 14, 30A, 30B, 21A, 21B and the like are each constituted by a pumping laser whose emission wavelength (980 nm, 1480 nm, etc.) is different from an output light wavelength (1550 nm band) of a fiber laser (see col. 1, lines 32-35 of Pan '962 patent). In a fiber laser, pump light from a pumping laser 14, ..., 21B, or the like is supplied to a fiber doped with erbium, etc., thereby population inversion is caused in the fiber. By reciprocal light reflection between two gratings that are formed at a distance in the fiber, laser oscillation is caused at a wavelength determined by energy level difference in the erbium ion.

As explained above, the arrangement disclosed in the Pan '962 patent differs entirely from the cavity laser recited in claim 1 which has a cavity formed by a reflective surface of a semiconductor laser and a grating. Thus, the Examiner's contention that the Pan '962 patent discloses a laser having a cavity formed between a reflective surface of a laser and a grating as stated at page 3, lines 1-4 of the September 12, 2002 Office Action is incorrect. Hence, the Examiner's view that the disclosure of Pan '962 or Pan '781 constitutes a bar to the patentability of this invention is not well grounded.

Regarding Hamakawa (USP 5,993,073), a cavity is certainly formed between a reflective surface of a semiconductor laser and a grating. However, Hamakawa merely contemplates, in an arrangement where the grating is disposed close to the

semiconductor laser, stabilizing a laser operation against changes in environmental temperature and the like, by returning light beams from a plurality of gratings with different Bragg wavelengths. Hamakawa never suggests stabilizing an operation by suppressing affections of reflection from a connector, and never suggests using an isolator.

Furthermore, in a laser device using such a grating as disclosed in Hamakawa having a wide reflection bandwidth (in the order of nm) (see the parameters described at col. 5 and col. 6 of Hamakawa), laser oscillation takes place in a plurality of longitudinal modes. This is because Hamakawa was created for a pumping light source for an optical fiber amplifier, and the reference does not relate to a laser for signal transmission.

In contrast, the cavity laser of the present claimed invention relates to a light source laser for signal transmission, such as picture transmission, as clearly described in the present application. In addition, laser oscillation of this invention takes place in a single longitudinal mode. Besides, the laser line width in the single longitudinal mode must be more narrow than that in the laser for the pumping light source disclosed in Hamakawa, which merely discloses a grating having a reflection bandwidth of several nm.

That is, claim 1 is patentable over the cited references, taken either alone or in combination, because the references do not disclose, teach or suggest a connector outputting the light oscillated by a cavity, the connector being the first connector

provided on an optical path extending from a laser light emitting device, intercepting means on the optical path between the fiber Bragg grating section and the connector to thereby intercept the reflected waves from the connector, with the intention of reducing the noise level caused by the provision of the connector.

In view of the foregoing, claim 1 and claims 4-10 which are dependent thereon, and new claims 11-18 which respectively correspond to claims 1 and 4-10, are patentable over the cited references under 35 USC 102 as well as 35 USC 103.

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If the Examiner disagrees with any of the foregoing, the Examiner is respectfully requested to point out where there is support for a contrary view.

Entry of the amendment, allowance of the claims, and the passing of the application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

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Respectfully submitted,

  
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